

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 30 May 2001 (30.05.01)	
International application No. PCT/SE00/01849	Applicant's or agent's file reference 176-99-9
International filing date (day/month/year) 25 September 2000 (25.09.00)	Priority date (day/month/year) 29 September 1999 (29.09.99)
Applicant LINDÉN, Michael et al	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

20 April 2001 (20.04.01)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer J. Leitao Telephone No.: (41-22) 338.83.38
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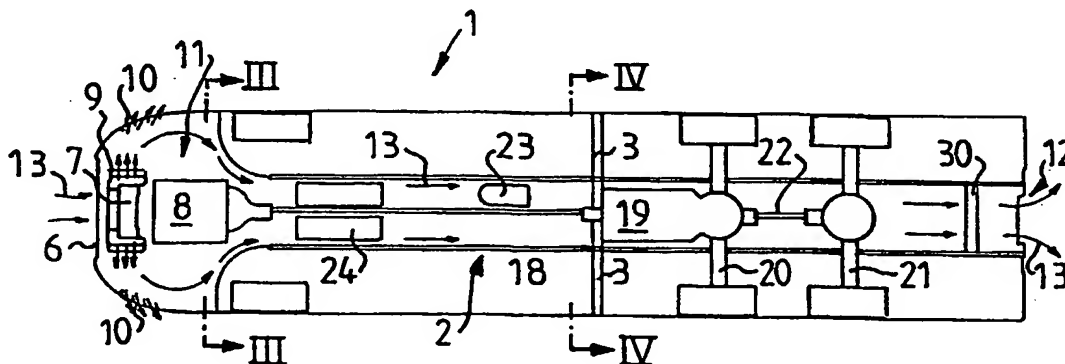
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For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: MOTOR VEHICLE WITH A FRONT-MOUNTED ENGINE



(57) Abstract: A motor vehicle (1) with a forward-mounted engine (8) and a forward-situated air intake (6) has a tubular chassis element (2) running in the longitudinal direction of the vehicle. Between the air intake (6) and the chassis element (2) there is a guide arrangement (11) for leading air into and through the chassis element past at least one major vehicle component (19), advantageously the vehicle's gearbox, situated inside the chassis element. Downstream from that major vehicle component there is an air outlet (12).

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MOTOR VEHICLE WITH A FRONT-MOUNTED ENGINE

Technical field

The invention relates to a motor vehicle with a forward-mounted engine, in
5 accordance with the preamble to patent claim 1.

State of the art

In trucks it is usual for the engine, clutch, gearbox and other components to be
situated far forward, under a driver's cab, which is often tiltable forwards to provide
10 access. These components and the driver's cab usually have extending to the rear of
them an open vehicle frame which consists of C-beams, supports rear axles and has on
top of it some form of load carrier which extends sideways beyond the vehicle frame.

Such a type of vehicle frame is relatively weak flexurally and torsionally and causes
15 limitations with regard to good running characteristics in cases where a rigid vehicle
frame is desired. This type of vehicle superstructure, with an engine space which is
usually open downwards, and with components situated at various points forward on
the vehicle, entails relatively large flow resistance which has unfavourable effects on
operational economics.

20 In the light of endeavours to improve the running characteristics and operational
economics of vehicles, arrangements of these known kinds therefore seem less
advantageous.

25 Object of the invention

The invention aims to provide an improved vehicle design which does not have the
aforesaid disadvantages.

Description of the invention

30 This object is achieved according to the invention by designing a motor vehicle
according to the definition in patent claim 1.

Providing motor vehicles with a tubular chassis element which can easily be made resistant to torsion and bending makes it possible for components forming part of the vehicle's driveline to be provided with good protection by being situated inside this chassis element. Further designing the vehicle so that air is led through this chassis element by means of a guide arrangement provides components within the chassis element with necessary cooling and makes it possible for the vehicle to be provided, by means of the guide arrangement and the chassis element, with a smoother underside and hence reduced flow resistance while in motion.

- 10 Further advantages and features of the invention are indicated in the ensuing description and patent claims.

Description of drawing

- 15 The invention is explained in more detail below on the basis of an embodiment depicted in the attached drawing, in which:

Fig. 1 is a perspective view, partly in section, of a motor vehicle according to the invention,

Fig. 2 is a schematic horizontal section through the vehicle in Fig. 1,

- 20 Fig. 3 is a section III-III in Fig. 2, and

Fig. 4 is a section IV-IV in Fig. 2.

Description of a preferred embodiment

- A motor vehicle 1 of the truck type depicted in Fig. 1 has, running in its longitudinal direction, a tubular chassis element 2 which is provided on each side with a number of support devices 3 which are distributed along the chassis element 2 and protrude sideways. The chassis element 2 and the support devices 3 have resting on them a load platform 4 which may possibly be provided with some form of superstructure. In front of the load platform 4 there is a driver's cab 5 which has at its front an air intake 6 which may possibly have a number of apertures in the vehicle's front.

As indicated in more detail in Fig. 2, there is behind the air intake 6 a fan 7, advantageously of radial type, which propels air radially towards a radiator 9 which

belongs to the vehicle's engine 8, is arranged round the fan 7 and may advantageously be divided into a number of individual radiator elements. The fan 7 and the radiator 9 are dimensioned to provide good cooling of the engine 8 in a variety of operating situations. Part of the air drawn in is discharged, after passing the radiator 9, via air vents 10, e.g. one on each side of the vehicle. The remainder of the air drawn in is led partly as combustion air to the engine 8 and partly via a guide arrangement 11 past the engine 8 into the inside of the tubular chassis element 2 before finally leaving the chassis element 2 via an air outlet 12 at the latter's rear end. The air flow is represented by arrows 13.

The guide arrangement 11 round the motor 8 includes (see Fig. 3) a lower portion 14 in the driver's cab 5, a bottom plate 15 arranged under the engine and a section 16 of the front wheel housing. These various parts are jointly designed so that air is led round the engine and rearwards to the chassis element 2. The bottom plate 15 is also intended to reduce air resistance by providing the front portion of the vehicle with a smooth underside. The engine 8 rests on beams 17 which are fastened in the forward end of the chassis element 2.

Fig. 2 also shows that from the engine 8 a forward driveshaft 18 runs inside the chassis element 2 to a gearbox 19 which is accommodated likewise inside the chassis element 2 and is situated immediately forward of, and is connected to, a first rear axle 20. A second rear axle 21 is driven from the gearbox 19 via a rear driveshaft 22. The air which flows through the chassis element 2 cools the gearbox 19 and also other components situated in the chassis element 2, e.g. a compressor 23 for the vehicle's brake system and components for the vehicle's air conditioning system. The two rear axles 20 and 21 are supported movably in the chassis element 2 via suspension parts not further detailed here.

The construction of the chassis element 2 executed in the form of a shell structure is indicated in more detail in Fig. 4. At mutual spacings along the chassis element 2 there are a number of rectangular ribs 25 which have panels 26 fastened round their sides so as to form a tubular space 27. At at least some of the ribs 25, support devices 3 are fastened on both sides and have side panels 28 and bottom panels 29 fastened to

them. The underside panels 26 and 29 provide the vehicle with a smooth underside, and the side panels 28 and bottom panels 29 create enclosed spaces for various components on both sides of the chassis element 2. Advantageously, at least some of the panels, or parts of them, are detachable to provide access to components in or
5 alongside the chassis element 2.

The air outlet 12 at the rear of the chassis element 2 may take the form of apertures in an endplate on the chassis element 2. It is possible for the chassis element 2 to contain a fan 30 to influence the air flow. One possibility is for this fan to be situated
10 at the air outlet 12. The ribs 25 forming part of the chassis element 2, and the panels 26, are dimensioned so as to create a structure resistant to bending and torsion. This combined with advantageously designed wheel suspensions makes improved vehicle running characteristics possible. The protected space within the rigid chassis element 2 makes it possible for the gearbox to be situated close to the vehicle's powered
15 wheels, resulting in good weight distribution, while at the same time the transmission path for large torques from the gearbox will be short and the gearbox will be in a well-protected location.

The air which flows through the chassis element 2 is normally intended for cooling
20 various components inside the chassis element, but it is of course possible, e.g. for operation in severe cold, to lead warmer air rearwards and thereby reduce the cooling. This may be achieved, for example, by using advantageously designed air flow switching devices to cause a greater proportion of the air passing the radiator 9 to pass through the chassis element 2.

25

The design of the guide arrangement 11 for the air flow rearwards round the engine 8 depends on the design of the forward portion of the vehicle and may therefore be designed otherwise than as described here.

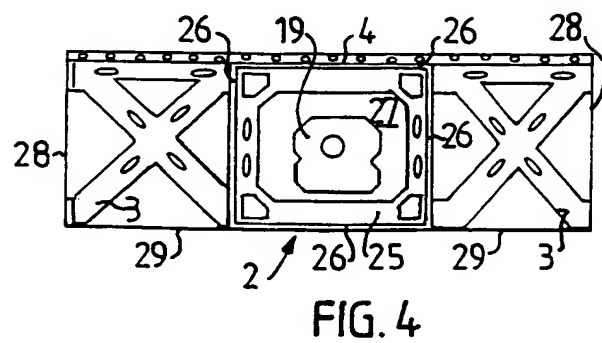
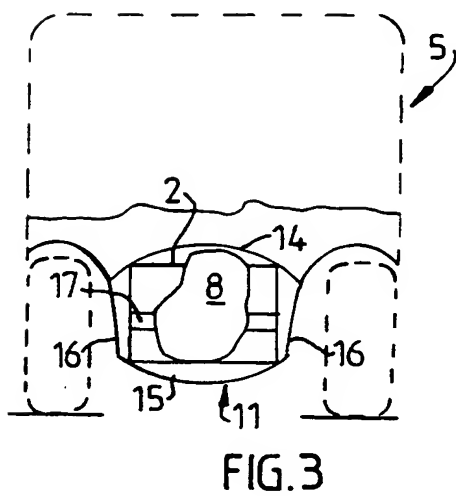
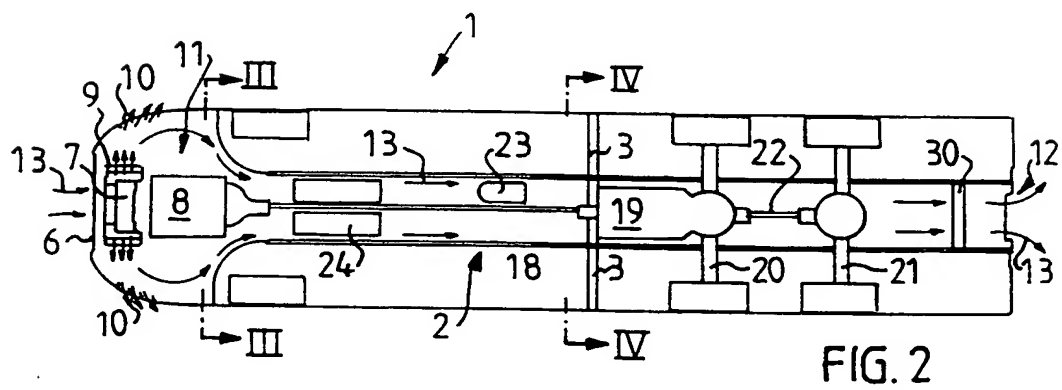
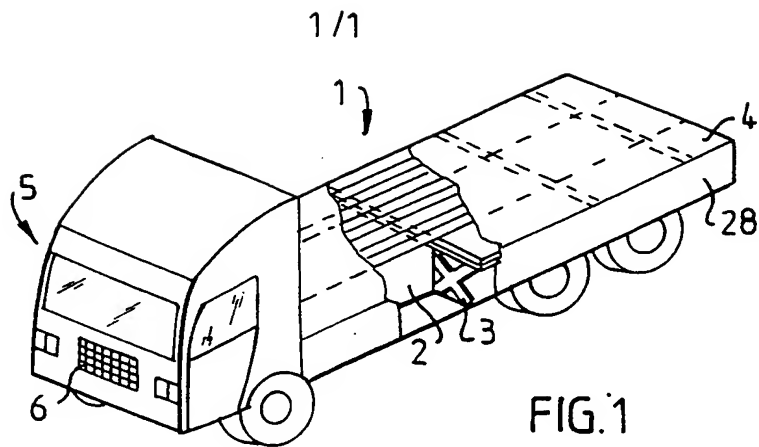
PATENT CLAIMS:

1. Motor vehicle which has a front-mounted engine (8) and at least one forward-situated air intake (6) and is provided with a tubular chassis element (2) running in the longitudinal direction of the vehicle, **characterised** in that between the air intake (6) and the chassis element (2) there is a guide arrangement (11) for leading air into and through the chassis element past at least one major vehicle component (19) arranged inside the chassis element, and that the chassis element (2) downstream from that major vehicle component (19) is provided with at least one air outlet (12).
2. Motor vehicle according to claim 1, **characterised** in that the engine (8) is arranged forward of the chassis element (2) and that the guide arrangement (11) surrounds the engine and is connected forwards to at least one air intake (6) and rearwards to the chassis element (2).
3. Motor vehicle according to claim 1 or 2, **characterised** in that there is inside the chassis element (2) a fan arrangement (30) for influencing the air flow through the chassis element.
4. Motor vehicle according to claim 3, **characterised** in that the fan arrangement (30) is situated in the rear of the chassis element.
5. Motor vehicle according to any one of claims 1-4, **characterised** in that the chassis element (2) is provided with an air outlet (12) arranged in a rear endplate.
6. Motor vehicle according to any one of claims 1-5, **characterised** in that at least one major component (19) of the vehicle's driveline, advantageously at least the vehicle's gearbox, is situated inside the chassis element (2).
7. Motor vehicle according to claim 6, **characterised** in that the gearbox (19) is situated close to a rear axle (20) of the vehicle.

8. Motor vehicle according to any one of the foregoing claims, **characterised** in that the guide arrangement (11) includes a bottom plate (15) situated under the engine (8).

5 9. Motor vehicle according to any one of the foregoing claims, **characterised** in that the guide arrangement (11) includes a lower portion (14) of the driver's cab of the vehicle.

10 10. Motor vehicle according to any one of the foregoing claims, **characterised** in that in the forward part of the vehicle there are air vents (10) which are designed to discharge part of the air quantity drawn into the vehicle, after it has passed the vehicle's radiator (9), and hence to limit the air quantity supplied to the guide arrangement (11).



PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 176-99-9	FOR FURTHER ACTION		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/SE00/01849	International filing date (day/month/year) 25.09.2000	Priority date (day/month/year) 29.09.1999	
International Patent Classification (IPC) or national classification and IPC ₇ B62D 21/17			
Applicant Scania CV Aktiebolag (publ) et al			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 20.04.2001	Date of completion of this report 21.06.2001
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer Göran Carlström/js Telephone No. 08-782 25 00

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE00/01849

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☐ the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement) under article 19
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the drawings:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item. These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE00/01849

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-10</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-10</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-10</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The claimed invention is not considered to be anticipated by the patent documents cited. None of these documents reveals the motor vehicle described in the claims.

The invention according to claims 1- 10 is therefore considered to be new, to involve an inventive step and to be industrially applicable.

DE 423116 C1 (ARNOLD SEIDEL)

SE 462426 B (SAAB-SCANIA AB)

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REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No. **PCT/SE 00 / 0 1 8 4 9**

International Filing Date **2 5 -09- 2000**

Name of receiving Office and "PCT International Application"
The Swedish Patent Office

Applicant's or agent's file reference
(if desired) (12 characters maximum) **176-99-9**

Box No. I TITLE OF INVENTION

Motor vehicle with a front mounted engine

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

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☐ This person is also inventor.

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Teleprinter No.
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State (that is, country) of nationality:
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State (that is, country) of residence:
SWEDEN

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

LINDÉN, Michael
Centralvägen 11
SE-152 57 Södertälje
SWEDEN

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
SWEDEN

State (that is, country) of residence:
SWEDEN

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

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☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

MODAHL, Fredrik
Enbyvägen 3 B
SE-145 90 Norsborg
SWEDEN

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
SWEDEN

State (that is, country) of residence:
SWEDEN

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

LÖGDBERG, Ola
Blommensbergsvägen 157
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SWEDEN

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
SWEDEN

State (that is, country) of residence:
SWEDEN

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

2 5 -09- 2000

Sheet No. 3.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent


- ☐ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|---|---|
| <input type="checkbox"/> AL Albania | <input type="checkbox"/> LS Lesotho |
| <input type="checkbox"/> AM Armenia | <input type="checkbox"/> LT Lithuania |
| <input type="checkbox"/> AT Austria | <input type="checkbox"/> LU Luxembourg |
| <input type="checkbox"/> AU Australia | <input type="checkbox"/> LV Latvia |
| <input type="checkbox"/> AZ Azerbaijan | <input type="checkbox"/> MD Republic of Moldova |
| <input type="checkbox"/> BA Bosnia and Herzegovina | <input type="checkbox"/> MG Madagascar |
| <input type="checkbox"/> BB Barbados | <input type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input type="checkbox"/> BG Bulgaria | <input type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BR Brazil | <input type="checkbox"/> MW Malawi |
| <input type="checkbox"/> BY Belarus | <input type="checkbox"/> MX Mexico |
| <input type="checkbox"/> CA Canada | <input type="checkbox"/> NO Norway |
| <input type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input type="checkbox"/> NZ New Zealand |
| <input type="checkbox"/> CN China | <input type="checkbox"/> PL Poland |
| <input type="checkbox"/> CU Cuba | <input type="checkbox"/> PT Portugal |
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| <input type="checkbox"/> ID Indonesia | <input type="checkbox"/> UG Uganda |
| <input type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> US United States of America |
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| <input checked="" type="checkbox"/> JP Japan | <input type="checkbox"/> VN Viet Nam |
| <input type="checkbox"/> KE Kenya | <input type="checkbox"/> YU Yugoslavia |
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| <input type="checkbox"/> KR Republic of Korea | |
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Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) 29 Sep 1999 (29.09.99)	9903518-0	SWEDEN		
item (2)				
item (3)				
<input checked="" type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): 9903518-0				
<small>* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.</small>				
Box No. VII INTERNATIONAL SEARCHING AUTHORITY				
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):		
ISA / SE		Date (day/month/year)	Number	Country (or regional Office)
Box No. VIII CHECK LIST; LANGUAGE OF FILING				
This international application contains the following number of sheets: request : 4 ✓ description (excluding sequence listing part) : 4 ✓ claims : 2 ✓ abstract : 1 ✓ drawings : 1 ✓ sequence listing part of description : Total number of sheets : 12		This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input checked="" type="checkbox"/> separate signed power of attorney 3. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any: 336,339 4. <input type="checkbox"/> statement explaining lack of signature 5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input type="checkbox"/> other (specify):		
Figure of the drawings which should accompany the abstract: 2		Language of filing of the international application: Swedish		
Box No. IX SIGNATURE OF APPLICANT OR AGENT				
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request). SCANIA CV AB (publ)  Hans Forsell				

For receiving Office use only		2. Drawings: <input checked="" type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application: 2 5 -10- 2000		
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA / SE	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.	

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1/1

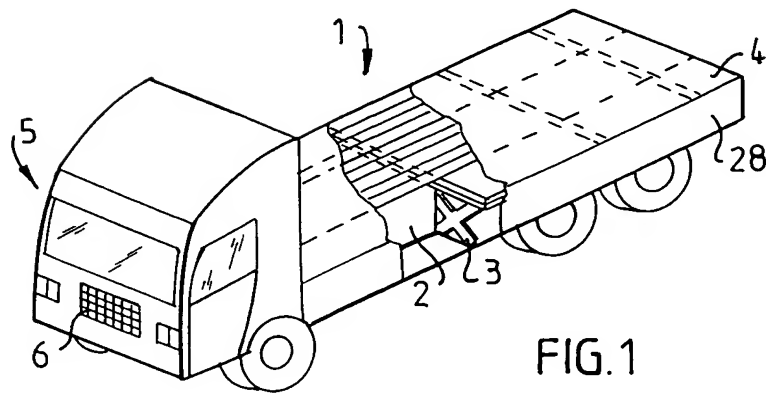


FIG. 1

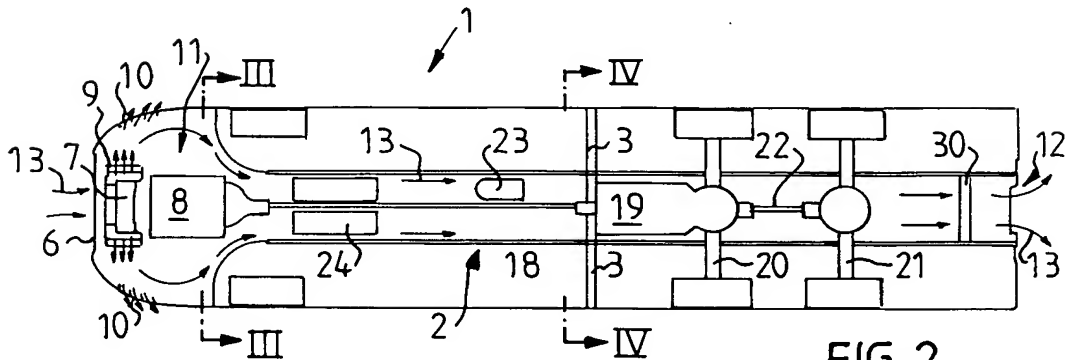


FIG. 2

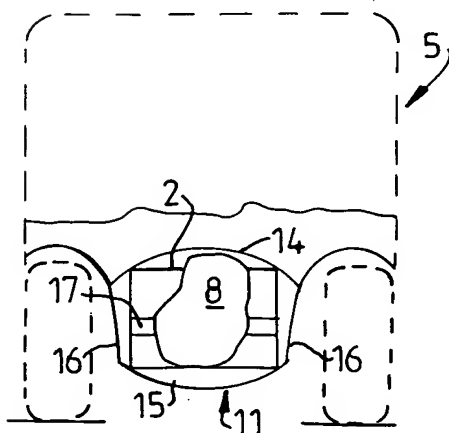


FIG. 3

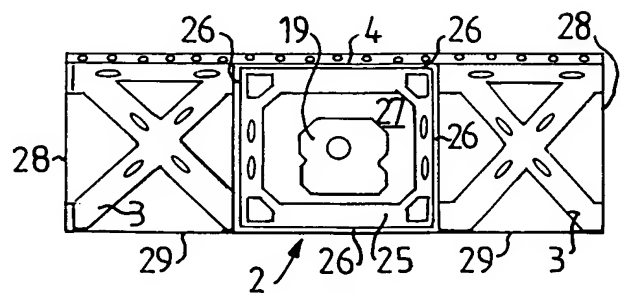


FIG. 4

MOTORFORDON MED EN FRAMTILL MONTERAD MOTOR

Tekniskt område

Uppfinningen avser ett motorfordon med en framtill monterad motor, enligt ingressen
5 till patentkrav 1.

Teknikens ståndpunkt

Vid lastbilar är det vanligt att placera motor, koppling, växellåda och andra komponenter långt fram, under en förarhytt, som ofta är tippbar framåt för att medge åtkom-
10 lighet. Bakom dessa komponenter och förarhytten sträcker sig i allmänhet en av C-balkar utförd öppen fordonsram, i vilken bakaxlar är upphängda, och ovanpå fordonsramen placeras någon form av lastbärare, som i sidled sträcker sig utanför fordonsramen.

15 En sådan typ av fordonsram är förhållandevis böj- och torsionsvek och ger begränsningar beträffande goda köregenskaper, där en styv fordonsram är önskvärd. Denna typ av fordonsuppbyggnad, med ett vanligen nedåt öppet motorrum och på olika ställen framtill på fordonet placerade komponenter ger upphov till relativt stort strömningsmotstånd, vilket påverkar driftekonomin ofördelaktigt.

20 I takt med att bättre köregenskaper och förbättrad driftekonomi eftersträvas framstår därför dessa kända utföranden såsom mindre fördelaktiga.

Uppfinningens ändamål

25 Uppfinningen syftar till att åstadkomma en förbättrad fordonskonstruktion som inte har de ovanstående nackdelarna.

Redogörelse för uppfinningen

Detta syfte uppnås enligt uppfinningen genom att utforma ett motorfordon enligt definitionen i patentkrav 1.

30

- Genom att förse motorfordonet med ett rörformigt chassielement, som enkelt kan göras vrid- och böjstyvt, blir det möjligt att placera komponenter ingående i fordonets drivlina väl skyddade inuti chassielementet. Genom att vidare utforma fordonet så att luft
- 5 med hjälp av ett ledarrangemang leds igenom chassielementet möjliggörs erforderlig kylning av komponenter inuti chassielementet, och dessutom kan fordonet med hjälp av ledarrangemanget och chassielementet ges en slätare undersida och därigenom minskat strömningsmotstånd under körning.
- 10 Ytterligare fördelar och särdrag hos uppfinningen framgår av efterföljande beskrivning och patentkrav.

Figurbeskrivning

- Uppfinningen förklaras i det följande närmare med hjälp av ett på bifogade ritning visat
- 15 utföringsexempel, varvid

- fig. 1 är en perspektivvy, delvis i snitt, av ett motorfordon enligt uppfinningen,
fig. 2 är ett schematiskt horisontalsnitt genom fordonet i fig. 1,
fig. 3 är ett snitt III-III i fig. 2, och
- 20 fig. 4 är ett snitt IV- IV i fig. 2.

Beskrivning av ett föredraget utföringsexempel

- Ett i fig.1 visat motorfordon 1 av lastbilstyp har ett i fordonets längdriktning gående, rörformigt chassielement 2, som på ömse sidor är försett med ett antal i sidled utstickande, längs chassielementet 2 fördelade stödorgan 3. På chassielementet 2 och stödorganen 3 vilar ett lastflak 4, som eventuellt kan vara försett med någon form av påbyggnad. Framför lastflaket 4 finns en förarhytt 5, i vars front det finns ett luftintag 6, som eventuellt kan ha flera öppningar i fordonsfronten.
- 25

Såsom närmare framgår av fig.2 finns bakom luftintaget 6 en fläkt 7, lämpligen av radialtyp, via vilken luft slungas i radiell led mot en runt fläkten 7 anordnad, till fordonets motor 8 hörande kylare 9, som lämpligen kan vara uppdelad i ett antal individuella kylarelement. Fläkten 7 och kylaren 9 är dimensionerade för att säkerställa en god
5 kylning av motorn 8 i olika driftsituationer. En viss del av den insugna luften släpps efter passage av kylaren 9 ut via luftutsläpp 10, t. ex. ett på vardera sidan av fordonet. Den återstående delen av den insugna luften leds dels såsom förbränningsluft till motorn 8 och dels via ett ledarrangemang 11 förbi motorn 8 och in i det inre av det rörformade chassielementet 2, för att slutligen lämna chassielementet 2 via ett luftutlopp
10 12 vid dettas bakre ände. Luftströmningen visas med pilar 13.

I ledarrangemanget 11 kring motorn 8 ingår, se fig.3, ett undre parti 14 i förarhytten 5, en under motorn 8 anordnad bottenplåt 15 och avsnitt 16 av främre hjulhus. Dessa delar är tillsammans så utformade att luft leds runt motorn och bakåt till chassielementet
15 2. Bottenplåten 15 har även till uppgift att i luftmotståndsminskande syfte ge fordonet en slät undersida framtill. Motorn 8 vilar på balkar 17, som är fästade i den främre änden av chassielementet 2.

Av fig.2 framgår vidare att från motorn 8 löper inuti chassielementet 2 en främre driv-
20 axel 18 till en likaså inuti chassielementet 2 placerad växellåda 19, som är belägen omedelbart framför en främre bakaxel 20 och är ansluten till denna. En bakre bakaxel 21 drivs från växellådan 19 via en bakre drivaxel 22. Den luft som strömmar igenom chassielementet 2 kyler växellådan 19 och även övriga komponenter som är placerade i chassielementet 2, t ex en kompressor 23 till fordonets bromssystem och komponenter
25 24 till fordonets klimatanläggning. De båda bakaxlarna 20 och 21 är rörligt upphängda i chassielementet 2 via här ej närmare visade upphängningsdetaljer.

Uppbyggnaden av det såsom en skalkonstruktion utförda chassielementet 2 framgår närmare av fig.4. På inbördes avstånd längs chassielementet 2 finns ett antal rektangulära spant 25, mot vilkas sidor paneler 26 är fästade runtom, så att ett rörformigt
30

utrymme 27 bildas. Vid åtminstone vissa av spanten 25 är stödorgan 3 fästade på ömse sidor, och på dessa stödorgan 3 är sidopaneler 28 och bottenpaneler 29 fästade. Med hjälp av undersidans paneler 26 och 29 får fordonet en slät undersida, och med hjälp av sidopanelerna 28 och bottenpanelerna 29 skapas slutna utrymmen för olika komponenter på ömse sidor om chassielementet 2. Åtminstone vissa av panelerna, eller delar av dem, är lämpligen löstagbara för att ge åtkomlighet av komponenter i eller vid sidan om chassielementet 2.

Luftutloppet 12 baktill på chassielementet 2 kan utgöras av öppningar i en gavel på chassielementet 2. Eventuellt kan det inuti chassielementet 2 finnas en fläkt 30 för att påverka luftströmningen. En möjlighet är att placera denna fläkt vid luftutloppet 12. De i chassielementet 2 ingående spanten 25 och panelerna 26 är så dimensinerade att en böj- och vridstyv konstruktion erhålls. Detta i kombination med lämpligt utformade hjulupphängningar möjliggör förbättrade köregenskaper för fordonet. Det skyddade utrymmet inuti det styva chassielementet 2 tillåter en placering av växellådan nära fordonets drivhjul. Härigenom vinnas en god viktfordelning, samtidigt som överföringsvägen för stora vridmoment från växellådan blir kort och växellådan får ett väl skyddat läge.

Den luft som strömmar igenom chassielementet 2 är normalt avsedd för kylning av olika komponenter inuti chassielementet, men det är naturligtvis möjligt att för t.ex. drift i svår kyla leda varmare luft bakåt och därigenom reducera kylningen. Detta kan t.ex. ske genom att en större del av den luft som passerat kylaren 9 leds igenom chassielementet 2 med hjälp av lämpligt utformade omställningsorgan för luftströmningen.

Utformningen av ledarrangemanget 11 för luftströmningen bakåt kring motorn 8 är beroende av hur fordonets främre del är utformad och kan därför ges annan utformning än vad som visats här.

PATENTKRAV:

1. Motorfordon med en framtill monterad motor (8) och med åtminstone ett framtill anordnat luftintag (6), samt försett med ett i fordonets längdriktning gående, rör-
5 formigt chassielement (2), **kännetecknat av** att mellan luftintag (6) och chassielement (2) finns anordnat ledarrangemang (11) för att leda in luft i chassielementet och igenom detta, förbi åtminstone ett inuti chassielementet anordnat aggregat (19), och att chassielementet (2) nedströms om detta aggregat (19) är försett med åtminstone ett luftutlopp (12).
10
2. Motorfordon enligt krav 1, **kännetecknat av** att motorn (8) är anordnad framför chassielementet (2), att ledarrangemanget (11) omsluter drivmotorn och framtill ansluter till åtminstone ett luftintag (6) samt baktill är anslutet till chassielementet (2).
- 15 3. Motorfordon enligt krav 1 eller 2, **kännetecknat av** att inuti chassielementet (2) finns anordnat en fläktanordning (30) för att påverka luftströmningen igenom chassielementet.
4. Motorfordon enligt krav 3, **kännetecknat av** att fläktanordningen (30) är anordnad
20 baktill i chassielementet.
5. Motorfordon enligt något av kraven 1-4, **kännetecknat av** att chassielementet (2) är försett med ett i en bakre gavel anordnat luftutlopp (12).
- 25 6. Motorfordon enligt något av kraven 1-5, **kännetecknat av** att inuti chassielementet (2) finns anordnat åtminstone en i fordonets drivlina ingående komponent (19), lämpligen åtminstone fordonets växellåda.
7. Motorfordon enligt krav 6, **kännetecknat av** att växellådan (19) är placerad vid en
30 bakaxel (20) på fordonet.

8. Motorfordon enligt något av föregående krav, **kännetecknat av** att i ledarrangemanget (11) ingår en under motorn (8) anordnad bottenplåt (15).

5 9. Motorfordon enligt något av föregående krav, **kännetecknat av** att i ledarrangemanget (11) ingår ett undre parti (14) av fordonets förarhytt.

10 10. Motorfordon enligt något av föregående krav, **kännetecknat av** att i fordonet finns framtill luftutsläpp (10) som är utformade att efter passage av fordonets kylare (9) leda ut en del av den i fordonet insugna luftmängden och därigenom begränsa den luftmängd som tillförs ledarrangemanget (11).

SAMMANDRAG

Ett motorfordon (1) med en framtill monterad motor (8) och ett framtill placerat luftintag (6) har ett i fordonets längdriktning gående, rörformigt chassielement (2). Mellan
5 luftintaget (6) och chassielementet (2) finns ett ledarrangemang (11) för att leda in luft i chassielementet och igenom detta, förbi åtminstone ett inuti chassielementet anordnat aggregat (19), lämpligen fordonets växellåda. Nedströms om detta aggregat finns anordnat ett luftutlopp (12).

10 (Fig.2)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01849

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B62D 21/17

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B62D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 423116 C1 (ARNOLD SEIDEL), 19 December 1925 (19.12.25) --	1-10
A	SE 462426 B (SAAB-SCANIA AB), 25 June 1990 (25.06.90) -- -----	1-10

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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Date of the actual completion of the international search	Date of mailing of the international search report
11 December 2000	12 -01- 2001
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Göran Carlström/js Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SE 00/01849

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
DE	423116	C1	19/12/25	NONE	
SE	462426	B	25/06/90	SE 8804691 A	29/12/88